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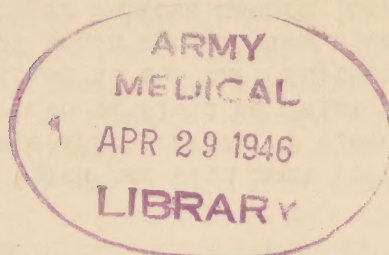
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GENERAL HEADQUARTERS  
UNITED STATES ARMY FORCES, PACIFIC  
OFFICE OF THE CHIEF SURGEON

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CIRCULAR LETTER )

NO . . . . . 50 )



PREVENTION AND CONTROL OF CHOLERA

1. General.

a. Serious outbreaks of cholera have recently occurred in India and in China. The movement homeward of millions of displaced peoples and the repatriation of Japanese will create conditions which will favor the spread of cholera to areas to be occupied by U.S. Army Forces. The possibility of cholera should be considered in every outbreak of enteric disease in the occupied areas.

b. Cholera is an acute enteric infection caused by the Vibrio comma. Susceptible individuals acquire the disease through the ingestion of food, drink or other material contaminated by feces which contain the specific organism. Contamination of water is one of the most important means of spreading cholera. Flies may play an important role. Epidemics are seasonal since their development is favored by climatic conditions such as high temperatures and intermittent heavy rainfall. An uncontrolled epidemic rapidly sweeps through an unprotected population and spreads along lines of communication with a speed proportional to the available means of transportation.

2. Course. The incubation period is usually from one to three days. Premonitory symptoms of depression, lack of energy, and simple diarrhea sometimes occur. Mild cases may be seen during epidemics which show only malaise and diarrhea throughout. In ordinary cases, the onset is sudden, with profuse, watery stools which quickly lose all fecal characteristics. Tenesmus is uncommon. Vomiting, which is copious, is often precipitate and free of nausea and retching. Prostration rapidly becomes severe. Patients are apathetic but clear in mind. Dehydration may reach an extreme degree in a very short time. There is great thirst. Large amounts of fluids and of mineral metabolites are lost, especially chlorine, sodium, and calcium. There is a strong tendency toward acidosis, and a marked shift may occur in the acid-base balance of the blood. Muscular cramps may be widespread and severe. The circulation is profoundly affected, with peripheral collapse and low blood pressure rapidly developing to a marked degree. The secretion of urine often fails and uremia often appears in severe cases. The course is usually run in a few days, averaging three to five. In fatal cases, death may occur in a few hours or after several days.

3. Diagnosis. The possibility of cholera should be brought to mind by epidemiological considerations. In the presence of an epidemic, every person having diarrhea or gastro-intestinal disturbance should be regarded as a cholera suspect. Cholera must be separated from: acute bacillary dysentery, in which the stool content is different and tenesmus is present, except in mild cases, and in which collapse is rare in adults; food poisoning, in which



distressing vomiting with nausea and retching and headache are common; clinical forms of malaria, chiefly falciparum malaria, in which intestinal symptoms and collapse occur; heat exhaustion and other conditions in which a state of shock develops. Cholera is diagnosed specifically by the identification of Vibrio comma in stool cultures. Fecal smears stained with carbol-fuchsin diluted 1 to 10, showing the comma forms with the "fish in stream" appearance, are suggestive. Specimens of feces from cases or suspected carriers should be planted (two or more loopfuls of liquid feces or mucus) without delay in several tubes of alkaline (pH 8.0 to 8.4) peptone water (peptone 1 percent, NaCl 0.5 percent) and incubated at 37° C. for six to eight hours. Examine the surface growth microscopically for typical gram-negative, slightly curved, motile rods. Streak onto nutrient or infusion agar. Typical twenty-four hour colonies resemble those of the other enteric gram-negative bacilli. Suspected colonies may be tested with specific Vibrio comma agglutinating serum using a slide technique and a 1:20 antiserum dilution. Suspicious colonies should be isolated and their identity confirmed by tube agglutination and biochemical study. Vibrio comma produces acid without gas in glucose, maltose, mannite, and sucrose. Lactose may become acid in fourteen days. Nitrites are produced from nitrates; indol is positive and gelatin is liquefied. Microscopic tube agglutinations should be done at 37° C. for two hours rather than at 56° C., since rapid lysis of the Vibrio occurs at the higher temperature. It should be noted that Vibrio comma is sometimes strongly or completely inhibited on the selective media such as E.M.B. agar or SS agar used for the isolation of other enteric pathogens.

4. Treatment. A patient with cholera represents a therapeutic emergency. The prompt institution and intelligent management of therapy are essential. Since it usually happens that a group of patients, often a very large number, must be treated at the same time, some general plan of action should be prepared and adhered to. Patients with subnormal temperatures should be kept warm. During the early stages of the disease, little or no attempt should be made to give the patient food, except such as he may be able to take in liquid form. The replacement of fluids and electrolytes is most important. During the acute stage, patients usually can retain only very little of the fluid taken by mouth; advantage should be taken, however, of any fluid that can be retained by this route. Reliance must be placed upon intravenous injections. Subcutaneous injections are not recommended. If sufficient supplies of standard solutions and standard sterile distilled water for intravenous administration are not available, solutions should be freshly prepared with distilled water and freshly sterilized. However, in grave emergencies when large groups of patients must be treated, the administration of fluid should not be withheld because of inability to use ideal technique. Plasma and whole blood generally are not necessary in cholera and may be very harmful. They should be given only when specific reasons for giving them are known to exist.

a. The criterion which has been most used as a guide in the administration of fluids is the specific gravity of blood. As the normal value is closely approached, the rate of fluid administration should be slowed, but the patient must be watched to see that further large losses of fluid are not occurring and do not begin again. The specific gravity of the blood may be determined by the copper sulfate method (See Office of The Chief Surgeon, AFAC, Circular Letter No 35, dtd 13 Aug 45). In general, judgment must be based especially on the blood pressure; but color and consistency of the blood, rate of the pulse, and amount of urine are also helpful. The development of



palpitation, restlessness, pain in the chest, coughing, or edema indicates that too much fluid has been given. In general, physiologic saline is the fluid to be used. A 5 percent solution of glucose in physiologic saline may be used but not more than 50 gm. of glucose should be given in one hour or 400 gm. in twenty-four hours. It is desirable, but not essential, to add thiamin chloride 1 mg. for every 25 gm. of glucose. Some observers believe that hypertonic saline in limited amounts gives better results, especially in early cases, before dehydration is severe. Most patients have an alkali deficit when they come under treatment, and all may develop this condition later if a favorable response is not secured. Hence, it is advised that treatment begin with a limited amount (500 cc.) of alkaline saline solution (sodium bicarbonate 18 gm. and sodium chloride 6 gm. per liter). The further administration of this solution must depend upon observation of the patient. The rate and depth of respiration are not good guides to the presence of acidosis in the acute stages of cholera, though they may be in the later stages. Ketone bodies are not necessarily present in the urine in acidosis due to cholera. Continued lack of urine formation is associated with the development of acidosis. The reaction of the urine may be used, within limits, as a guide to the further need of alkali.

b. General routine. The following plan is recommended as an initial proceeding: Two thousand cc. of fluid should be administered intravenously in the first two hours. Of this amount, 1,500 cc. should be physiologic saline solution with 75 gm. glucose. The remainder of this amount of 2,000 cc. should consist of 500 cc. of alkaline saline solution. This amount of saline solution is almost never sufficient to cover the needs of a patient, although it is often not necessary to supply more alkaline solution. Further physiologic saline solution, often in the amount of 1,000 cc., will be needed every three or four hours in many cases. The amount and type of such fluid will be determined in accordance with the principles outlined in par 4 a above.

c. The value of the sulfonamides and penicillin in the treatment of cholera is uncertain. Because of the frequent failure of renal secretion, it is believed that sulfadiazine and other well-absorbed sulfonamides should not be given by any route. The use of sulfaguanidine is suggested; if it is given, full doses should be administered: 5 gm. four times a day or 3.5 gm. six times a day for four or five days. Penicillin in large dosage should be tried in a suitable series of patients, with adequate controls. No bactericidal or antitoxic serum which is known to be efficacious is available. Digitalis, epinephrine, hypnotics, sedatives, and laxatives are not efficacious in the treatment of cholera and may interfere with the proper treatment of the patient.

#### 5. Preventive Measures to be Instituted in Advance of Known Cholera.

a. Immunization. Immunization against cholera is required by ATAC Cir. 78, subject: Immunization, dated 26 September 1945, for personnel in the Philippines and in occupied areas. The initial vaccination consists of two subcutaneous injections of cholera vaccine at a 7 to 10 day interval, the first 0.5 cc., the second 1.0 cc. The stimulating dose of 1.0 cc. is given every 4 months.

b. Medical Intelligence. Close liaison should be maintained by unit surgeons with local military government and civilian public health authorities to assure early information of the presence of cholera.



c. Training of Case Finding Teams. Case finding teams for the control of quarantinable diseases should be trained in recognition of cholera and in the control measures peculiar to the disease.

d. Supply. Timely requisitions of supplies and equipment essential to control and treatment of cholera. The essentials for control are cholera vaccine, materials for water purification and water testing, for fly control and for screening of kitchens, mess halls, latrines, and cholera wards. Adequate amounts of saline and glucose solutions are important for treatment of patients.

## 6. Control Measures - Sporadic or Endemic Cholera.

a. Isolation. Patients and proved carriers should be strictly isolated. Special care must be taken in the disposal of excreta and vomitus and all articles contaminated by them. Patient's clothing, bedding and eating utensils should be disinfected by boiling. All attendants should wash their hands with soap and water immediately after handling patients or any article contaminated by them. A cholera ward should be screened and remote from any ground source of water and from any mess or kitchen.

b. Foreign quarantine. Military personnel found or suspected to be infected with cholera must be detained within the country where the infection was recognized until the individual is determined, by negative stool cultures, to be uninfected, except as conditions are modified by martial law or military necessity. Freedom of the stool from cholera vibrios is usually required for release from detention. Evidence of valid immunization and freedom from symptoms of cholera at the time of travel may be taken to fulfill quarantine requirements of other military personnel. (WD Cir. 453, 9 Nov 44).

c. Immunization. All American military personnel in an area in which cholera is present should receive a stimulating dose of 1.0 cc. of cholera vaccine.

d. Water Supply. Particular care should be exercised to safeguard water supplies when the danger of cholera exists. A special sanitary survey of the water supply of fixed installations should be made by a qualified sanitary engineer. A chlorine residual of not less than 0.4 parts per million should be maintained in the active part of the distribution system at all times. Field water supplies will be checked to insure maintenance of required chlorine residuals until the water is consumed. All personnel should be specifically directed not to consume water except from sources approved by the surgeon, either for drinking or for oral hygiene; nor to bathe or swim in non-treated waters.

e. Food and Food Handlers. Native help from cholera infected localities should be excluded as food handlers at military installations. All military food handlers should be re-examined, and special emphasis placed on personal hygiene and on care in the handling of foods. Stool cultures should be made at frequent intervals. The need for prompt report of any gastrointestinal disturbance, even a minor upset, should be stressed. Food should be eaten only in military messes. All civilian establishments should be declared off limits. Fresh fruits and vegetables must be cooked before being eaten. Careful attention should be paid to the washing and disinfection of eating and cooking utensils. If boiling water is not available, utensils should be immersed in a solution of Compound Germicidal Rinse (1 unit in 25 gallons of water) after washing and rinsing. They should be air dried, with protection from insects and dust during drying and subsequent storage.



f. Fly Control. Adequate screening of kitchens, messes, isolation wards and latrines should be provided and maintained in good repair. Proper disposal of organic waste materials should be enforced to prevent breeding of flies. In the field it is essential that flies be denied access to human feces by fly-proof construction of latrines. When native labor is employed, proper latrine facilities should be provided and their use enforced.

Destruction of adult flies by the use of insecticides, traps, and swatting should have close attention, especially in sick wards, kitchens, mess halls and latrines. DDT may be used to kill adult flies by applying it as a residual spray; and to kill larvae in organic wastes by applying as a spray or powder. Residual spray, 5 percent DDT in kerosene, QM Stock No. 51-I-305, applied to surfaces on which flies commonly rest, will remain lethal to flies for 3 months. The recommended rate of application is 1 pint to 1 quart per 250 square feet. Screens, walls, ceilings, light fixtures, garbage racks and latrines should be treated. The residual effect of the DDT is however destroyed by washing of the treated surface or by exposure to weather, and regular re-applications are therefore required.

To kill fly larvae in pit latrines, DDT residual spray is recommended, applied evenly over the fecal contents at the rate of two ounces per latrine box hole ( $\frac{1}{2}$  ounce per square foot). This treatment should be repeated twice a week. Larger amounts of DDT spray up to a pint per hole may be required for initial control in latrines where fly populations are already well established. Early control of adult flies may be advanced by airplane spraying with DDT of areas in which the disease is prevalent.

## 7. Control Measures with Cholera Epidemics.

a. Quarantine. Use of off limits regulations, area quarantine or even institution of a cordon sanitaire depending upon the seriousness of the situation.

b. Immunization. Extension of vaccination against cholera to residents of heavily infected civilian communities or parts of communities.

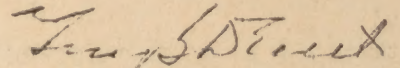
c. Operation of Control Teams. Full use should be made of special case finding teams and of insect control teams.

(1) Epidemiologic case finding teams should be designated. Each team should comprise a minimum of one medical officer qualified in communicable disease, and two laboratory technicians. These teams will:

- (a) Confirm diagnoses and make epidemiologic case studies of all proven or suspected cases of cholera.
- (b) Advise with surgeons of all echelons and public health personnel of military government on specific and general control measures.
- (c) Assure immunization of essential civilian personnel engaged in cholera control.



- (d) Aid and advise hospital authorities, military and civilian in methods for proper isolation of patients.
  - (e) Submit daily reports on newly recognized cases to the surgeon to whom they are responsible.
- (2) Insect Control Teams. (AFMAC, Cir. 42, dated 14 August 1945)
- (a) Institute a fly control program in infected communities.
  - (b) Aid in improvement of community or unit sanitation in collaboration with sanitary engineers of the command, with special attention to water supplies.



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